E-KALFASOF: FUTURE FRAGRANT FABRIC SOFTENER

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PROJECT TITILE: PLANTS OIL vs FOSSIL OIL

- Eliminate static and wrinkle fabrics.
- Permeates into fabric fibers.
- Bleaching evader.
- Clothes feel softer and smell better.
- Breathing in fresh scent.

- Abundant raw material from agricultural parks, restaurants, food processing industries, etc. and inexpensive.
- Shortly time and simple manufacturing methods.
- Low energy and economical.
- Offered E-KALFASOF: < RM 4.00/L.
- Clothes awake from stretching, fading and accumulating fuzz.

COMMERCIALIZED DRYER SHEETS & LIQUID SOFTENERS
- Expensive can be produced in Malaysia.
- Long time and ineffective methods.
- High energy requirement.
- Dryer sheets: RM 32.00–45.00.
- Liquid softener: RM 7.00–10.00/L.

PATENT
- PI 2013004396

PRODUCT BACKGROUND

E-KALFASOF VS. FABRIC SOFTENER

- ABUNDANT AVAILABLE
- SIMPLE PROCESSING
- RENEWABLE SOURCES

- LIMITED ASSETS
- MULTI STEPS PROCESSING
- NON-RENEWABLE SOURCES

PRODUCT CHARACTERISTICS

- E-KALFASOF COMPARED OTHERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>This Product (E-KALFASOF)</th>
<th>KEB5, 2007</th>
<th>Carlson, 2012</th>
<th>Kao, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cationic Content (%)</td>
<td>10-20</td>
<td>3-20</td>
<td>60-90</td>
<td>18.9</td>
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<tr>
<td>Viscosity, cps</td>
<td>116-357.5</td>
<td>80-150</td>
<td>80-700</td>
<td>50-100</td>
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<tr>
<td>pH</td>
<td>4.9-6.4</td>
<td>2-7</td>
<td>3-8</td>
<td>2.5-3</td>
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<tr>
<td>Oil emulsification Layer</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>-</td>
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<tr>
<td>Hard water</td>
<td>83</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

NOVELTY

Utilization of lemon grass and kaffir lime rind and leaves as unused waste for valuable products.
Extracted plants oil by UAE-HD as feedstocks for fabric liquid softener synthesis.
Renewable raw materials and abundant.
Cheaper processing.
Uncomplicated product quality controlling.
Sustainable technology.

MARKETABILITY

- National market demand: Textile industries, Hotels, Hospitals, Launderies Houses, Student’s Hostels & Housing Parks.
- International market: Indonesian, Vietnam, Thailand, etc.

ACHIEVEMENTS

CTREX 2016: Gold Medal